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Estimation Analysis of Soft Computing Techniques Using ELECTRE Method

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Abstract

Soft computing is synthetic Intelligence is the end of man and nature Computation based on choice Defined as a group of techniques, It is a difficult computer to analyze So complex that there are no formulas Quick and cost effective for issues provides a lower resolution. In Soft Computing, Human Nerve Zone and Ant Behavior such as the evolution of a particular species one where you can see the changes you may consider the example. Exact for computational problems but workable solutions Use of approximate calculations to provide is soft computing. The approach is intractable or solves with current hardware Very time consuming Implements solutions to problems. ELECTRE (Elimination et Choix Traduisant La Realit - Elimination and Choice Reveals Reality) methods are widely used in many real-world decision-making problems, from recruitment to transportation and more. Theoretical research on the fundamentals of electre methods is also active at this time. Alternative: Genetic Algorithms, Genetic Programming, Particle Swarn Optimization, Ant Colony Optimization. Evaluation Preference: Fuzzy Competing, Neural Network, Evolutionary Compeering, Machine Learning, Swarm Intelligence, Some Additional Techniques. In this paper, soft computing techniques for ELECTRE in genetic programming are ranked first, while genetic algorithms are ranked lowest.

Key words: Neural Networks, Soft computing, Fuzzy logic and neuroscience, MCDM Method.

1. Introduction

Soft computing is hard the reverse of conventional computing. It is artificial intelligence (AI) and Based on natural selection Refers to a group of computational techniques. No hard computing solution this is for complex real-life problems Provides cost-effective solutions. Soft in Zadeh 1992 coined the term computer. For complex real-life problems Accurate approximation and fast providing solutions is soft Purpose of computer. Soft Computing Techniques Optimization A long time to solve problems is being used. Various Fields real-life problems provide, they are minimum mathematically, difficult to solve in principle are; so, relatively accurate Soft computing is best for forecasting. Various techniques and methods Aggregate, they are integrated working together in a manner, and the situation is indefinite For data processing while Outcome based on competency measurement Be flexible. This calculation the main objective of the approach for the sole purpose of accurate measurement is to use a degree of tolerance, Very accurate reasoning there the potential is uncertain from a solution Reduces character. The solution is strong as cost-effective as possible Must be accurate. It is soft two cores of computing Fuzzy synthesis explores concepts Theory and Neural Networks, This is uncertainty manipulation and respectively with machine learning techniques related to Methods are imprecise for character and ambiguity are tolerant. This is real One of the uncertainties found in life Solves problems with the element. It creates linguistic variables and can feel. This is for problems Able to obtain approximate solutions

2. Soft Computing Techniques

Soft computing techniques Stock market is linear It is possible to hold relationships The candidates are significant Input data for forecasting results About statistical distributions No prior knowledge is necessary. They are neurotic and neurotic ambiguous Focus on techniques and for forecasting stock markets are used. input data, Forecasting method, performance evaluation and efficiency used Based on activities Classifications are made. Stock and to study market behavior Soft to evaluate Computing techniques are widespread Examined as accepted [1].In forecasting water demand Soft computing is much more seems to contribute. These contribution Various ANN architectures in areas, Unsupervised methods, Deep learning, various metaheuristics and ensemble methods including, but not limited to. Also, soft computing methods Mainly short term demand are used for forecasting [2].soft computing techniques of two Integral, F-transform and Fuzzy Tendency Modeling Also for time series analysis Also used for

forecasting. The proposed method is time series Two-term additive decomposition is based on, the first of which Term using direct F-transform elements The low frequency that is expressed is the trend and the second term is the residual vector. [3].To overcome these drawbacks, Soft Computing (SC) approaches have been introduced. Calculus In contrast to the method, the SC problem is a transforms into an optimization task and evolutionary or search mechanism solves it by using A for this A good initial guess isn't necessary, either gets trapped in a local minimum Chances are less, its integration And the success rate is high. Also, due to its versatility, More than one for HEPWM angles To obtain possible solution sets It increases the chances. For HEPWM The literature on SC is diverse Scattered in Journals: Computing, Electronics Electrical, Mathematics, Energy etc. Readers to do relevant work Conveniently, the techniques are systematic Classification is given in this paper[4].Predictions are performance degradation And about upcoming failures Through early warnings Organizational health management Aims to improve. It can be classified into two types. model based and data driven. Physics based forecasting Dependent on organizational knowledge [5].Due to these advantages, the software Predicting errors is important Research becomes problematic. In fact, The purpose of the assessment is valid and available in various regions, And many other proposed predictions Or there are classification methods Decision Trees, Neural Networks, Vector machines, logistic Regression etc. Also, this Some of the methods are used for software. The fault listed in section 2 Prediction problem. This study is three Different soft computer Select methods [6].The main objectives of the thesis are Complex, non-linear problems A method capable of solving The need to have Enhances and recognizes learning and human knowledge such as understanding Introducing. For IK problems Different soft computing tools Use and implementation, Comparative analysis, best one Decisions to choose Analyzing or at least So much for solving some IK problem Compromise on what is appropriate Doing this [7].Fuzzy logic and neuroscience such as networks (NNs). Soft computing techniques, Exact math plant Control objectives without models can be used to achieve Robotic systems, electric drives, power systems, Communication channel etc Control of complex systems Fuzzy logic and or Neural Network Control Strategies About the mechanics of using achieved without prior knowledge[8].In this section, modeling of the machining process Turning to relevant key points and milling of two topics Let's explain below. These are two widely Machining processes used. Turning is mainly axially asymmetric Used to manufacture components, Grinding at the same time is important flat surfaces or To create prismatic shapes is used The discussion here is important finite element methods and Through soft computing techniques For modeling machining processes Aiming to provide background contains Technology of processes For details, read this [9].Soft computing methods, An Artificial Neural Network (ANN), An adaptive neural ambiguity Many textbooks can be consulted on the subject Inferential structure (ANFIS) and genetics Expression Programming (GEP) includes these In the study ET0 were compared to modelling. The FAO56 Penman−Monteith model is a considered as reference model and Priestley-Taylor, Hargreaves, Hargreaves-Samani, Muckink and Muckink-Hanson Using empirical methods, Soft computing models were compared. Squared Error, Mean Absolute Error and Nash-Sutcliffe Model Performance is co-performance. Soft Computing models in ET0 modeling are superior to empirical methods. Among soft computing methods, ANN is ANFIS and GEP found better than [10].This multidisciplinary study IKBIS A new four-step called Soft computer knowledge identification Thermal insulation failure of the model Enables detection. Input and Output variables and data For dimension reduction To examine the relationship between Exploratory Projection Pursuit It uses methods proposes. Heating of the building Computer for modeling dynamics Identity theory and neuroscience It also uses networks. Finally, the novel model is dynamic Used to predict thermal dependence, And its empirical verification Two real case studies in part [11].New soft computing (SC) methods Once created, level them With sophisticated methods for stopping Compare their performance Seeing is the main interest. However, own research centerOther methods are sufficient Intelligence and control Due to adherence efforts Such comparisons are rare. Without mastering other methods Competing conclusions from the literature Obtainable scale problems If more widely accepted This problem can be avoided [12].Soft computing (SC) models Non-linear behavior Exponential and linear statistics More complex than approaches and Dynamic settings are more efficient describe. Of fuzzy models From the beginning of the concept, this We have seen dynamic growth in the region. Many well-established methods, Design principles, comprehensive Instructions and carefully reported There are case studies. Hybrid neuro-fuzzy Design Environments and Succession A useful and detailed framework Development paradigms have emerged [13].Four different soft computing Accuracy of Methods, Adaptive Neuro-Phys with Inference System (ANFIS). Phase distribution (GP), subtraction with ANFIS Clustering (SC), Artificial Neuroscience Networks (ANN) and Support vector regression (SVR). are explored in this. Long term without climate data Prediction of monthly rainfall. Out of 50 stations in Iran From climate component, longitude, latitude and elevation data were used are used as inputs to models [14].In these methods, in predicting the target Good skills and high accuracy Due to the use of soft computing has been expanded. Complex calculation Useful for dealing with problems Software to deliver solutions vector regression (SVR).Includes computing. This Includes computing. This In research, artificial neuroscience Networks, group of data manipulation Methodology and gene expression programming The three methods included are FRP of columns defined with are used to predict compressive strength [15].In addn., of the Tarcian approach Fundamentally heterogeneous Formodeling hydrological systems Usually a large number The input data required are: Not available immediately. In this context, The main objective of this paper is to Flow discharges from these systems Two smooth

to accurately simulate A comparison of computer approaches. Over the past two decades, soft Computing methods in hydrological studies have met with growing interest and As a powerful alternative modeling tool are used. Human reasoning Soft by following the process Computing is triggered [16].Various soft computing methods Using a variety of non-traditional The turning functions were investigated. Among these functions, cutting speed, Machining method, material type and tool Overhang length is machined were used as inputs. surface Hardness, constant depth of cut and maximum cutting tool Temperatures are machine outputs were considered. In the first stage, synthetic Neural Network, Classification and regression tree (CART) and support These are vector machine models were developed to predict outputs[17].Therefore, in PV systems To eliminate linearity, smooth Computer techniques are introduced. Soft computing is typical From hard computing, imprecise character, dubious character, part Based on fact and assessment Disagree. In fact, for soft computing The prototypical human mind. Science Based on a direct report, Soft In computing techniques, especially PV Published in systems Research Papers, 20 in 2000 increased to 290 in 2015 from This researchers soft They have shown more interest in the field of computing. As a graph in soft computing (SC) methods As shown, grid-connected PV Troubleshoots system issues The ability is there. Recently, panel retrofit, MPPT, Harmonic elimination of inverters, Soft Computing Algorithms Islanding detection using Many papers have been published in such areas. [18].

3. ELECTRE

ELECTRE is a multi-level exam rating Is a family with techniques alternatives to the underlying hassle by means of making the set of actions as accurate and applicable as viable or by way of casting off options that outperform Others. Team selection is real- Very suitable for global selection-product Is an effective process for delivering the solution situations industrial manipulate alternatives towards Release of a chemical contaminant surroundings. In this have a look at, four consultant manufacturing plants in France High environment for EOL product solution in a mechanism for selecting, the final The module used ELECTRE III. An illustrative example is given, in which The product is a phone. At the final degree of the process of verifying the On environmental and social impact Indicators used exams, the signs must be taken care of into classes. In one case have a look at related to 4 indicators, 3 MCDA strategies have been in comparison to deal with the final stage [19]. Electricity (Elimination at Choice Trade Realistic to assist multi-scale choice making (MCDA) on many actual global choice-making issues, Environment from agriculture and up to water management, plans Create funds. Selection, team of worker’s recruitment first delivery and so forth. Theoretical studies on the basics of ELECTRE methods is likewise energetic right now. We accept as true with its far excessive time to expand the comprehensive traits of ELECTRE strategies via emphasizing their state-of-the-art extensions [20]. Attracting users with the simplest version The goal is to upgrade to a previous version. Guide styles for both versions Based on (Start Page, Select Size, Weight systems, door settings and ranking view) algorithm was used has the same user interface both versions and the required values are different [21]. To overcome this shortcoming, ELECTRE easily captures The choice maker's subjective evaluation of the dealer choice standards. Accurate and consistent supplier choice consequences. Second, drawing a actual case, this observe as compared and outstanding among the traditional crisp and ELECTRE strategies. Of the three opportunity providers in our case, dealer C was discovered to be the maximum beneficial dealer under the ambiguous ELECTRE technique, whereas dealer A become identified because the most suitable provider whilst using the soft ELECTRE method [22]. The ELECTRE method was used as a transcendental relationship theory to analyse data related to the results matrix. Concordance and Discordance Indexes in Engineering Four Mathematical troubles can be taken into consideration as a degree of the dissatisfaction a choice maker makes use of in choosing an alternative. We take into account the M opportunity and n quit standards. Each alternative is rated according for every criterion shape a result matrix [23]. As mentioned above the ELECTRE algorithm There are some drawbacks If it is properly addressed will be very attractive to use the problem in network selection. It’s Considers the application and top-ranked candidate networks of all alternatives required to be identified Does not provide absolute ranking. In this paper, the ELECTRE algorithm an alternative to using The approach is developed [24]. The ELECTRE approach starts with the intuitively attractive prototype that can only make approximate comparisons of a DM’s performance. Of alternatives. This system allows programs that are not equal in number to be considered equal. Outreach does not have a print basis, but rather parameters and decision-making algorithm. It is still necessary to give the DM Analyst scores for alternatives against the criteria, but the priority system is 'designed' by an approach that sets limits that reflect the DM's preferences for inaccurate comparisons of these performances [25]. To support the selection process, properly coordinated We are the ELECTRE TRI assistant We propose It guesses priority from assignment examples given by DM Model parameters. The paper follows Organized: The next section is ELECTRE TRI A brief methodological description of the method Gives and choose section 3 How processes Explains supporting [26]. ELECTRE is a first aid method that first applies the concept of a decision-making relationship; It should only be used if all criteria are encoded in numerical measurements with identical limits. The end Repair with four criteria Model for contract problem and sample with ELECTRE method Includes applied theory ELECTRE is from the best of alternatives from worst to worst is a system. The ELECTRE method was used for the actual selection Solid Waste Management Organization process [27].Electre method of the previous methods Have played a key role in the team. The main purpose of the elector is to systematically use transcendental relationships. Outreach methods help to use incomplete value information, for example priority of judgments at the

ordinal level [28]. There can be three types: mutual reinforcement effect (synergy), mutual weakening effect (redundancy) and hostile effect. For example, when rating sport cars, maximum speed and acceleration may be considered unnecessary because, in general, fast cars also have good acceleration. Therefore, although these two criteria are very important for DM-preferred sports cars, their overall significance is The importance of being considered individually of two criteria Is smaller than the sum [29]. ELECTRE methods are required to accurately measure performance. The alternatives in each criterion and the corresponding stock for The mass of a criterion is its voting power Reflects, which is in favour of an over-relationship Contributes to the majority. Weights Should not be dependent encryption of limits or scales and cannot be interpreted as conversion ratios like the compensating MCDA methods. Of ELECTRE methods Key Limit (All family systems of MCDA methods) may depend on the subjective input of the decision maker [30].

4. Analysis and Discussion

TABLE 1. Soft computing techniques

	Fuzzy Comptering	**Neural Network**	**Evolutionary Computering**	**Machine Learning**	**Swarm Intelligence**	**Some Additional Techniques**
Genetic Algorithms	100	123	91	101	78	55
Genetic Programming	150	145	95	102	85	99
Particle Swarn Optimization	125	130	92	104	73	95
Ant Colony Optimization	105	115	86	103	65	82

Table 1 Shows the Soft computing techniques for analysis using the ELECTRE Method. Genetic Algorithns, Genetic Programming, Particle Swarn Optimization, Ant Colony Optimization. Fuzzy Comptering, Neural Network, Evolutionary Computering, Machine Learning, Swarm Intelligence, Some Additional Techniques.it seen also for Data set of the value.

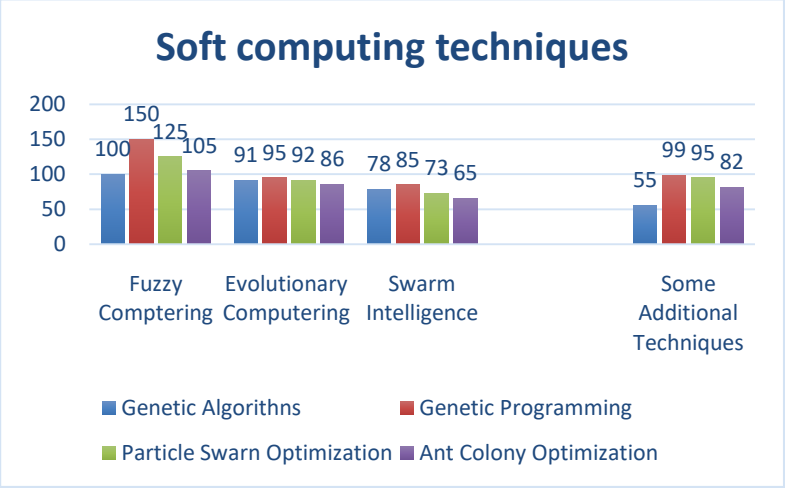

FIGURE 1. Soft computing techniques

Figure 1. Soft computing techniques graphical view of the Fuzzy Competing it is seen that Genetic Programming is showing the highest value for Genetic Algorithmic showing the lowest value. Neural Network it is seen that Genetic Programming is showing the highest value for Ant Colony Optimization is showing the lowest value. Evolutionary Computeringit is seen that Genetic Programming is showing the highest value for Ant Colony Optimization is showing the lowest value. Machine Learning it is seen that Particle Swarn Optimization is showing the highest value for Genetic Algorithms is showing the lowest value. Swarm Intelligence it is seen that Genetic Programming is showing the highest value for Ant Colony Optimization is showing the lowest value. Some Additional Techniques it is seen that Genetic Programming is showing the highest value for Genetic Algorithms is showing the lowest value.

TABLE 2. Soft computing techniquesSUM & SQRT

	Fuzzy Comptering	**Neural Network**	**Evolutionary Computering**	**Machine Learning**	**Swarm Intelligence**	**Some Additional Techniques**
Genetic Algorithns	10000	15129	8281	10201	6084	3025
Genetic Programming	22500	21025	9025	10404	7225	9801
Particle SwarnOptimization	15625	16900	8464	10816	5329	9025
Ant Colony Optimization	11025	13225	7396	10609	4225	6724
	59150	66279	33166	42030	22863	28575
	243.2077	257.4471	182.1153	205.0122	151.2052	169.0414

Table 2 shows the Soft computing techniques SUM & SQRT value of Genetic Algorithns, Genetic Programming, Particle Swarn Optimization, Ant Colony Optimization. Fuzzy Comptering, Neural Network, Evolutionary Computering, Machine Learning, Swarm Intelligence, Some Additional Techniques. This table mention the SUM & SQRT value in Fuzzy Compteringis showing the highest value for Swarm Intelligence is showing the lowest value.

TABLE 3. Normalized Data Matrix

	Fuzzy Comptering	**Neural Network**	**Evolutionary Computering**	**Machine Learning**	**Swarm Intelligence**	**Some Additional Techniques**
Genetic Algorithns	0.411171	0.477768	0.499683	0.492654	0.515855	0.325364
Genetic Programming	0.616757	0.563223	0.521647	0.497531	0.56215	0.585655
Particle Swarn optimization	0.513964	0.504958	0.505174	0.507287	0.482788	0.561992
Ant Colony Optimization	0.43173	0.446694	0.472228	0.502409	0.42988	0.485088

Table 3.Shows the Normalized Data Matrix of Genetic Algorithms, Genetic Programming, Particle Swarn Optimization, Ant Colony Optimization. Fuzzy Comptering, Neural Network, Evolutionary Computering, Machine Learning, Swarm Intelligence, Some Additional Techniques is Normalized Data Matrix value.

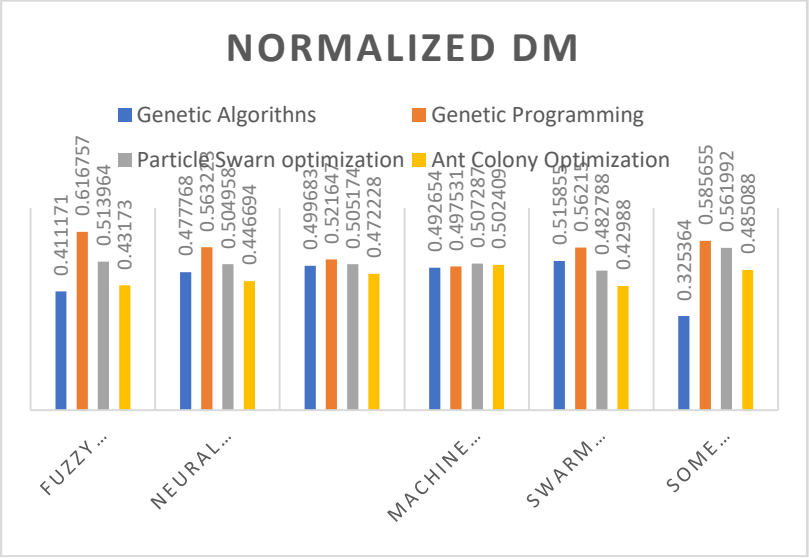

FIGURE 2. Normalized Data Matrix

Figure 2 Shows the Normalized Data Matrix of Genetic Algorithms, Genetic Programming, Particle Swarn Optimization, Ant Colony Optimization. Fuzzy Comptering, Neural Network, Evolutionary Computering, Machine Learning, Swarm Intelligence, Some Additional Techniques is Normalized Data Matrix value.

TABLE 4. Weighted Normalized matrix

	0.2336	0.1652	0.3355	0.1021	0.0424	0.1212
	Fuzzy Comptering	**Neural Network**	**Evolutionary Computering**	**Machine Learning**	**Swarm Intelligence**	**Some Additional Techniques**
Genetic Algorithns	0.09605	0.078927	0.167644	0.0503	0.021872	0.039434
Genetic Programming	0.144074	0.093044	0.175013	0.050798	0.023835	0.070981
Particle Swarn optimization	0.120062	0.083419	0.169486	0.051794	0.02047	0.068113
Ant Colony Optimization	0.100852	0.073794	0.158433	0.051296	0.018227	0.058793

Table 4 Shows the Weighted Normalized matrix value of the Genetic Algorithns, Genetic Programming, Particle Swarn Optimization, Ant Colony Optimization. Fuzzy Comptering, Neural Network, Evolutionary Computering, Machine Learning, Swarm Intelligence, Some Additional Techniques in Normalized Data Matrix multiplication criterion Weights this will be going to multiply again will be constant Weighted Normalized matrix value.

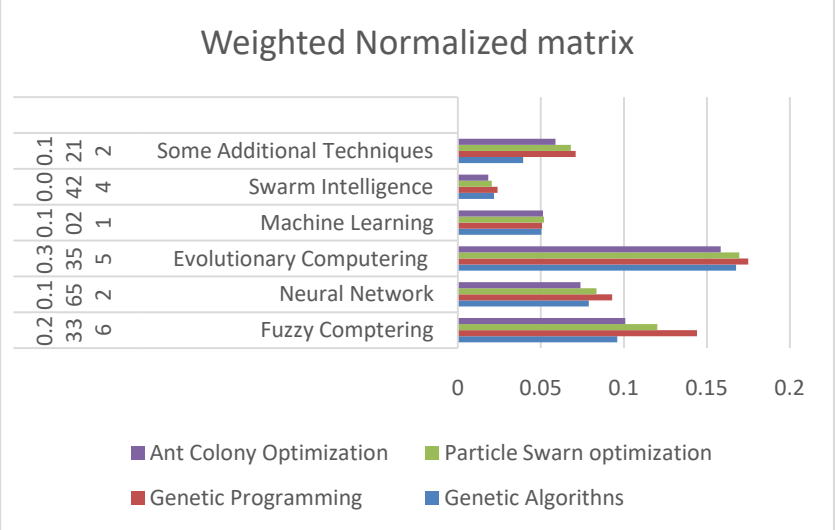

FIGURE 3. Weighted Normalized matrix

Figure 3 Shows the Weighted Normalized matrix value of the Genetic Algorithns, Genetic Programming, Particle Swarn Optimization, Ant Colony Optimization. Fuzzy Comptering, Neural Network, Evolutionary Computering, Machine Learning, Swarm Intelligence, Some Additional Techniques in Normalized Data Matrix multiplication criterion Weightsthis will be going to multiply again will be constant Weighted Normalized matrix value.

TABLE 5. Concordance Interval Matrix & Discordance Interval Matrix

C12 ={2}	D12 = {1,3,4,5,6}
C13 = {3,5}	D13={1,2,4,6}
C14 = {2}	D14={1,3,4,5,6}
C21={1,3,4,5,6}	D21={2}
C23={1,3,5}	D23={2,4,6}
C24={1,4}	D24={2,3,5,6}
C31={1,2,4,6}	D31={3,5}
C32={2,4,6}	D32={1,3,5}
C34={1,2,4,6}	D34={3,5}
C41={1,3,4,5,6}	D41={2}
C42={2,3,5,6}	D42={1,4}
C43={3,5}	D43={1,2,4,6}

Table 5 shows the Concordance Interval Matrix & Discordance Interval Matrix is showing the Common Value.

TABLE 6. Concordance Value

0	0	0	0	0	0
0	0	0	0	1	0
0	1	1	0	1	0
1	1	1	1	1	1
1	1	1	0	1	1
1	1	1	0	1	1
1	1	1	1	0	1
0	0	0	1	0	0
1	1	1	1	1	1

Table 6 Shows the Concordance Value for Water technology using the ELECTRE Method =IF(I12>=I13,1,0) to =IF(N14>=N15,1,0) is the Common Value.

TABLE 7. Concordance Interval Matrix

	Concordance Interval Matrix					
	M1	M2	M3	M4		
M1	0	0.1652	0.3779	0.1652	0.7083	
M2	0.8348	0	0.6115	0.3357	1.782	
M3	0.6221	0.3885	0	0.6221	1.6327	
M4	0.8348	0.6643	0.3779	0	1.877	
	2.2917	1.218	1.3673	1.123	6	0.5
						c bar

Table 7 Shows the Concordance Interval Matrix in shown the value Table 4 addition of I10 to N10.

TABLE 8. Concordance Index Matrix

	Concordance Index Matrix			
	M1	**M2**	**M3**	**M4**
M1	0	0	0	0
M2	1	0	1	0
M3	1	0	0	1
M4	1	1	0	0

Table 8 Shows the Concordance Interval Matrix in shown the value of Water technology using the ELECTRE Method =IF(J29>=0.5,1,0) to =IF(M32>=0.5,1,0) is the Concordance Interval Matrix.

TABLE 9. Discordance value

	C1	C2	C3	C4	C5	C6
D12	0.048025	0.014117	0.007369	0.000498	0.001963	0.031547
	1					
D13	0.024012	0.004492	0.001842	0.001494	0.001402	0.028679
	1					
D14	0.004802	0.005133	0.009211	0.000996	0.003645	0.019359
	1					
D21	0.048025	0.014117	0.007369	0.000498	0.001963	0.031547
	0.293954					
D23	0.024012	0.009625	0.005527	0.000996	0.003365	0.002868
	0.400846					
D24	0.043222	0.019251	0.01658	0.000498	0.005608	0.012189
	0.445385					
D31	0.024012	0.004492	0.001842	0.001494	0.001402	0.028679
	0.064236					
D32	0.024012	0.009625	0.005527	0.000996	0.003365	0.002868
	1					
D34	0.01921	0.009625	0.011053	0.000498	0.002243	0.009321
	0.575403					
D41	0.004802	0.005133	0.009211	0.000996	0.003645	0.019359
	0.265179					
D42	0.043222	0.019251	0.01658	0.000498	0.005608	0.012189
	1					
D43	0.01921	0.009625	0.011053	0.000498	0.002243	0.009321
	1					

Table 9 Shows the Discordance value of Soft computing techniques Table 4 Weighted Normalized matrix and table 5 Concordance Interval Matrix & Discordance Interval Matrix or using the Formula =ABS(B43-B44) and Maximum is shown the Manufacturing Companies Value.

TABLE 10. Discordance Index matrix

Discordance Interval Matrix					
	M1	**M2**	**M3**	**M4**	
M1	0	1	1	1	3
M2	0.293954	0	0.400846	0.445385	1.140185
M3	0.064236	1	0	0.575403	1.639638
M4	0.265179	1	1	0	2.265179
	0.623368	3	2.400846	2.020787	8.045002
				d bar	0.670417

Table 10 show the Discordance Index matrix for Soft computing techniques is using the Table 9 Discordance value.

TABLE 11. Discordance Index matrix

Discordance Index matrix				
	M1	**M2**	**M3**	**M4**
M1	1	0	0	0
M2	1	1	1	1
M3	1	0	1	1
M4	1	0	0	1

Table 11 show the Discordance Index matrix for Water technology is using the Table 8 Discordance value.

TABLE 12. Net superior value &Net Inferior Value& rank

	Net superior value	**Rank**	**Net Inferior Value**	**Rank**
Genetic Algorithns	-1.5834	4	2.376632	4
Genetic Programming	0.564	2	-1.85982	1
Particle Swarn optimization	0.2654	3	-0.76121	2
Ant Colony Optimization	0.754	1	0.244392	3

Table 12 Shows the Final Result of Net superior value & Rank The Genetic Algorithns is in 4th rank, The Genetic Programming is in 2nd rank, The Particle Swarn optimization is in 3rd rank, The Ant Colony Optimization is in 1st rank of the Net Inferior Value&RankThe Genetic Algorithns is in 4th rank, The Genetic Programming is in 1st rank, The Particle Swarn optimization is in 2nd rank, The Ant Colony Optimization is in 3rd rank

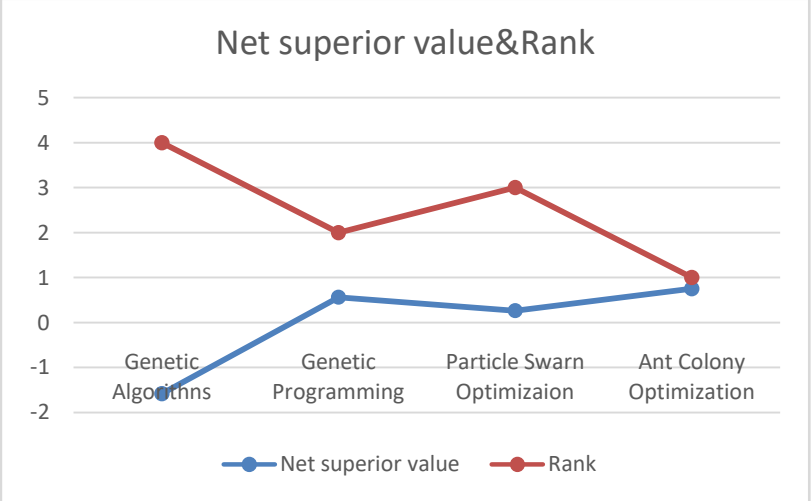

FIGURE 4. Net superior value & Rank

Figure 4. shows the Net superior value & Rank The Genetic Algorithms is in Fourth rank, The Genetic Programming is in Second rank, The Particle Swarn optimization is in Third rank, The Ant Colony Optimization is in First rank.

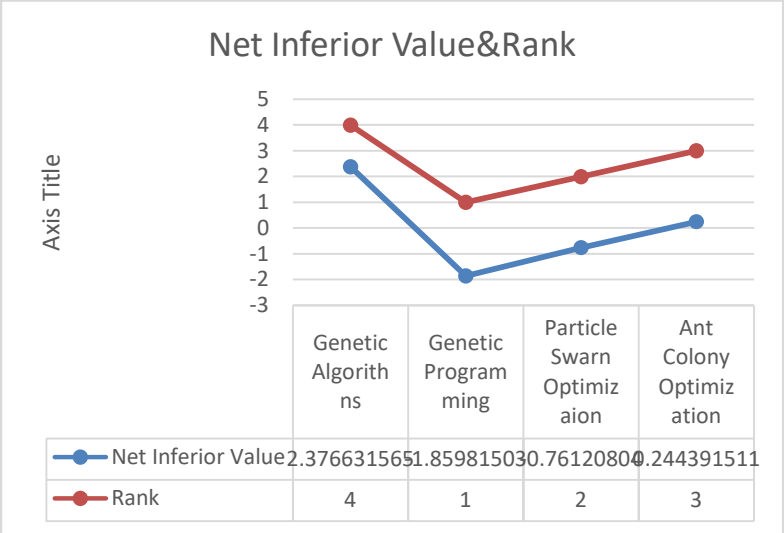

FIGURE 5. Net Inferior Value& rank

Figure 5. Shows the Net Inferior Value& rank The Genetic Algorithms is in Fourth rank, The Genetic Programming is in First rank, The Particle Swarn optimization is in Second rank, and The Ant Colony Optimization is in Third rank.

5. Conclusion

Soft computing is synthetic intelligence (human-like decision) and based on natural selection As a group of computational techniques Defined, it is analysis No complicated computer formulas Faster for more complex problems and provides a cost-effective solution. Soft computing, traditional Computing, traditional In contrast to computing, approx Models and complex real life Provides solutions to problems. Unlike hard computing, Soft computing is imprecise, uncertain Characterization, partial truth and approximations Tolerating. Actually, the soft The prototype for computing is human the mind Relies on the right solutions Faster for more complex problems In contrast to conventional computing techniques, Soft computing is imprecise Aiming to exercise endurance contains, trivial of the problem and Uncertainty quickly becomes a problem gives an approximate solution. In this paper, Soft Computing Techniques for ELECTRE in The Genetic Algorithms fourth Rank and The Genetic Programming First rank, The Particle Swarm Optimization ranks second; The Ant Colony Optimization is also third-rate.

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